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ABSTRACT OF THE DISCLOSURE

A programmable thermal sensor is implemented in an integrated circuit such as a microprocessor. The programmable thermal sensor monitors the temperature of the integrated circuit, and generates an output to indicate that the temperature of the integrated circuit has attained a pre-programmed threshold temperature. In a microprocessor implementation, the microprocessor contains a processor unit, an internal register, microprogram and clock circuitry. The microprogram writes programmable input values, corresponding to threshold temperatures, to the internal register. The programmable thermal sensor reads the programmable input values, and generates an interrupt when the temperature of the microprocessor reaches the threshold temperature. In addition to a programmable thermal sensor, the microprocessor contains a fail safe thermal sensor that halts operation of the microprocessor when the temperature attains a critical temperature.